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USSR Report

AGRICULTURE

(FOUO 4/81)

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AGRO-ECONOMICS AND ORGANIZATION

INTERRELATIONSHIPS OF PRIVATE PLOTS WITH PUBLIC SECTOR DISCUSSED

Moscow VOPROSY EKONOMIKI in Russian No 5, May 81 pp 66-74

[Article by G.I. Shmelev, doctor of economic sciences and head of a sector at the Institute of Economics of the World Socialist System of the USSR Academy of Sciences: "Public Production and the Private Sector"]

[Text] Under socialism, a close link exists between public and private ownership. Socialist ownership of the means of production and the nature of associating a worker with the means of production determine the relationships in distribution, production, exchange and consumption -- at all levels in the reproduction process in the national economy. Public ownership of the principal means of production under socialism, through the distribution system, forms private ownership of consumer goods. The LPKh [lichnoye podzobnoye khozyaystvo; private sector] is a component element and a special type of private ownership under socialism. The socialist nature of the LPKh is determined by the socialist production relationships and by the participation of the LPKh in the reproduction of vital resources and the income of workers in public production and in the creation of an all-state fund for food products.

In connection with the entrance of our country into the period of a developed socialist society and the conversion of a number of European countries -- SEMA member states -- over to the construction of developed socialism raises the need for a theoretical interpretation and evaluation of the conformity of these and other categories and forms of production to the new historic conditions. This applies fully to the private sector. The experience of the Soviet Union and other socialist countries reveals that, during the stage of constructing a developed socialist society and in addition to strengthening the logistical base of the public sector of agriculture, an active program should be carried out aimed at supporting the private plots and increasing their production. If the public sector of production in agriculture in a particular country is well developed, it will be better able to furnish assistance to the LPKh and exert influence upon it. The LPKh supplements the public sector of production. The agricultural productive fixed capital of the LPKh, at the beginning of 1980, amounted to 4.9 percent of all agricultural productive fixed capital (in comparable prices of 1973).

In delivering his report before the 26th CPSU Congress, L.I. Brezhnev noted: "The kolkhozes and sovkhozes have been and continue to be the foundation for socialist agriculture. But by no means is this meant to imply that the potential of the

private plots is to be neglected. Experience testifies to the fact that such plots can provide substantial assistance in the production of meat, milk and certain other products. The orchards, gardens, poultry and livestock which belong to the workers represent a portion of our overall wealth." During this particular stage in the development of the productive forces of society, the establishment of large-scale national economic complexes and the studying of the interrelationships existing within these complexes require that the LPKh be viewed as a necessary part of the country's agroindustrial complex. The country's food program, which was developed based upon a decision handed down by the Politburo of the CC CPSU and which must place in action all of the reserves available for improving food security, must necessarily include the LPKh.

The relationahips between the public and private sectors is dependent upon the development of the productive forces of agriculture. A considerable proportion of products is produced in the LPKh, the production of which is more labor-consuming and mechanized to a lesser degree. During the post-war period, the production of grain on the private plots almost ceased (in 1940, these plots accounted for 12 percent of the overall grain production). In field crop husbandry, a considerable contribution was made by the LPKh in fruit production, potato production and in the production of vegetables (in 1979, approximately 60 percent of the potatoes and 42 percent of the fruit and berries were produced in the LPKh). In animal husbandry, a substantial proportion was contributed by the LPKh in swine production, poultry production, goat raising and rabbit breeding. In 1979 the LPKh accounted for approximately 96 percent of the rabbit meat, roughly 40 percent of the pork, mutton, goat's meat and poultry meat, 33 percent of the horse meat, 27 percent of the reindeer and camel meat and 17 percent of the beef and veal.

It is from a regional standpoint that the differences in the production structure between the public sector and the LPKh stand out most clearly. Thus, in Estonia approximately 94 percent of all of the wool is produced in the LPKh and only 6 percent by the kolkhozes and sovkhozes. In Belorussia the LPKh accounts for roughly 4 percent of the wool produced in the republic and the remainder -- in the public sector. In Moldavia, Azerbaijan and Armenia -- republics having large specialized farms for intensive highly commerical horticulture -- the kolkhozes and sovkhozes account for 70-75 percent of the gross yield of fruits and berries. The situation is just the opposite in Belorussia and the Baltic republics. Here the larger portion of these products (85-90 percent) is produced on the private plots of the population. The state procurements of surplus fruits and berries grown in the LPKh of these republics exceeds to a considerable degree their production volume in the public sector: in Belorussia -- by a factor of 4, in Lithuania -- 5.5 and in Latvia -- by a factor of 3.5. The private plots serve as the principal source for supplying the local population with such products, the production of which in the public sector in these or other rayons is limited by the natural-climatic and other conditions.

The output of products per unit of space in the LPKh, owing to great labor expenditures, is substantially higher in a number of instances than in the public sector. For example, in Belorussia the LPKh accounted for approximately 45 percent of all of the fruit and berry plantations in the republic and yet in 1977 their gross yield of fruit and berries exceeded by a factor of 12 the amounts obtained in the public sector; the LPKh in Latvia obtained a fruit and berry harvest that exceeded by roughly a factor of 10 the amount obtained from the same area at

kolkhozes and sovkhozes. Substantial differences in the production structure for the LPKh, caused by natural-climatic conditions, professional skills and national traditions in nutrition, have been noted for individual republics and regions. For example, in the case of meat production, the largest proportion of beef and veal in the private sector is produced in the Uzbek and Turkmen SSR's (approximately 73 and 59 percent respectively and for the country as a whole -- roughly 26 percent), mutton -- in the Tadzhik SSR (41 percent, for the country -- 7.4 percent), pork -- in the BSSR (roughly 80 percent and for the country -- 46 percent).

The accounting in agrarian policies of the proportions existing in production between the public sector and the LPKh promotes improvements in the supply of food goods and the achievement of a balance in the population's nutrition. Production in the LPKh is less commerical than in the public sector, and the food products are more adaptable to the personal requirements of the owners and to the national traditions of the local population.

The social structure of the owners of private plots is complicated. They consist mainly of kolkhoz members and sovkhoz workers; individual private plots are also operated by the manual and office workers of non-agricultural enterprises and institutes in cities and villages and also by pensioners; manual and office workers engaging in horticulture and gardening constitute a large and special group. The dynamics of those engaged in the LPKh, in terms of their social affiliation, chan[illegible] in conformity with a change taking place in the social structure of society and in the agrarian policies of the state. In recent years, among those persons operating private plots, a decrease has taken place in the number of kolkhoz members while the number of manual and office workers has increased. This is partly associated with the transformation of a number of kolkhozes and sovkhozes, with the creation of interfarm and agroindustrial formations and also with the transfer of many kolkhoz members over to working in other branches of the national economy. In addition, it is associated with an expansion in collective horticulture and gardening by manual and office workers, as a useful activity encouraged by the state.

Whereas prior to the war the majority of the private plots were operated by kolkhoz members, today manual and office workers and other population groups predominate as operators of private plots. This circumstance has been taken into account in the new USSR Constitution. In the 1936 USSR Constitution, use was made of the term "private plot of a kolkhoz member" and in the present USSR Constitution -- "private plot of a citizen." The latter reflects the actual changes in the social structure of private plot owners.

In the USSR at the present time, the private plots are operated by 13 million families of kolkhoz members, more than 10 million families of sovkhoz workers and roughly by the same number of families of manual and office workers of other branches of the national economy. The advances achieved in the social structure of private plot owners have brought about changes in the proportion of individual groups of the population in the production of gross agricultural output. The proportion of manual and office workers associated with such output is on the order of 50 percent and for some products it even exceeds this level. The proportion of manual and office worker private plots amounts to approximately 52 percent in the production of fruits and berries and approximately 56 percent in the production of

sheep and goat raising products. In the RSFSR, Kazakhstan, Azerbaijan, Latvia, Armenia and Estonia the proportion of kolkhoz members operating private plots is less than the proportion of manual and office workers and other groups of the population.

The maximum norms for the private plots and the production volumes for the private plots of kolkhoz members are higher than those for sovkhoz workers, and they differ in particular when compared to the production volume and structure of the private plots city residents (per yard or family). At the present time, the average size of a private plot of a kolkhoz member is 0.31 hectares, of manual and office workers in rural areas -- 0.17 hectares (including sovkhoz workers -- 0.21 hectares and manual and office workers in cities -- 0.07 hectares). However, the average size and the number of livestock for the private plots of kolkhoz members are lagging substantially behind the maximum permissible norms established in the Model Regulations for a Kolkhoz.

Differences also exist between the public and private sectors in connection with the age and sex structure of the workers. For example, in 1978, the number of males of able-bodied age at kolkhozes accounted for one half of all labor expenditures and in the private sector -- only approximately 20 percent. The proportion of labor expenditures for women of pension age at kolkhozes did not reach 3 percent and in the private economy it amounted to almost one fourth of all labor expenditures. A considerable proportion of the labor expenditures in the private economy were accounted for by those who, because of family circumstances or reasons of health (mothers in families of rural workers having young children and invalids) or age (juveniles, elderly people), are unable to participate in public production and also by those for whom the private plots serve as a means for continuing work at the end of the working day in the public sector. Thus the private sector is expanding the sphere of participation by the population in productive labor and in the creation of a national economic fund for agricultural products. The ratio for the production of agricultural products in the public and private sectors does not remain stationary.

Ratio for Production of Agricultural Products in Public and Private Sectors (in comparable prices of 1973; for country as a whole; in %)

	Output of Public Farms	Output of Private Plots
1960	64.4	35.6
1965	67.5	32.5
1970	70.3	29.7
1975	71.7	28.3
1979	73.5	26.5

It is apparent from the cited data that the proportion of private plot output is constantly decreasing (in 1960 it exceeded by one third the gross output of agriculture and in 1979 it already amounted to roughly one fourth). However, this is not meant to imply that the private plots cannot keep the population supplied with food products, since notwithstanding the reduction in the proportion contributed by such farms to gross agricultural output, their output volume has on

the whole increased. In 1978 and compared to the 1961-1965 period, production on the private plots (in comparable prices) increased by 13.7 percent, including crop husbandry output -- by 26.5 and animal husbandry output -- by 8 percent. Moreover, the amount of land assigned for use by the population changed very little over the past 20 years. The reduction in the proportion contributed by the private plots to gross agricultural output occurred as a result of higher rates of growth for kolkhoz and sovkhoz production (compared to private plot production) and not as a result of a reduction in the volume of production on farms of the population.

Kolkhoz members, sovkhoz workers and rural pensioners obtain the principal bulk of such vitally important food products as meat, milk, eggs, fruit, berries, vegetables and potatoes from the private plots. In particular, a high proportion of such products is obtained from the private plots of kolkhoz members. In 1977, the private plots (not counting the products purchased on the kolkhoz markets) supplied them with 72 percent of the meat consumed, 76 percent of the milk and almost all of the potatoes and eggs. Moreover, it should be borne in mind that the system of public catering in the rural areas, which functions within the framework of consumer cooperation, is supported almost exclusively by means of procurements from private plots. The kolkhoz market and intra-village trade, where the products of private plots are also sold for the most part, play an important role with regard to supplying in the rural areas with food goods.

The development of specialization in public production is promoting an increase in the importance of the private sector for supplying diverse food products for the families of rural residents. As a result of the increasing level of specialization in public production, almost one fourth of the country's kolkhozes did not maintain swine during 1980, more than 50 percent of the kolkhozes did not have sheep or goats (in Belorussia, Lithuania and Estonia, swine were lacking on 90 percent of the farms), 64 percent of all of the kolkhozes did not breed poultry (in the nonchernozem zone of the RSFSR, Belorussia, Georgia and Lithuania, 90-97 percent of the kolkhozes did not breed poultry). Thus the private plots continue to be the principal source for supplying kolkhoz members with the products of these branches of animal husbandry. While supplying the rural population with food products, the private plots are at the same time creating the conditions required for maintaining a high proportion of sales to the state of products produced in the public sector (at kolkhozes, sovkhozes and so forth). The private sector participates directly in the reproduction of agricultural output in the public sector through the sale of a considerable number of young livestock to the kolkhozes and sovkhozes for subsequent fattening and also a portion of its seed potatoes and vegetables.

The private sector represents an important source for delivering products to the country's food fund through the kolkhoz market and consumer cooperation. The proportion of marketable products compared to the overall volume of production on farms of the population is indeed considerable. In 1979 this proportion amounted to 34 percent for vegetables, 37 for meat, approximately 17 for potatoes and 14 percent for eggs and milk. Moreover, 47 percent of the potatoes, 43 percent of the vegetables , 42 percent of the meat, approximately 80 percent of the milk, 40 percent of the eggs and more than 90 percent of the wool sold by farms of the population were sold as state procurements and not on the kolkhoz market. State procurements constitute a considerable proportion of the gross output of the private sector.

Proportion of State Procurements of Overall Output Produced on Private Plots (in %)

	1940	1950	1960	1965	1970	1975	1979
Potatoes	6.9	4.1	3.2	4.8	2.9	4.8	8.0
Vegetables	1.6	2.4	5.5	6.9	8.6	8.8	15.0
Meat	14.7	12.1	19.4	20.0	32.6	30.4	15.7
Milk	8.9	14.0	6.5	6.0	5.0	10.0	10.0
Eggs	21.7	10.6	10.9	13.8	9.4	8.9	5.7

Based upon the above table, it is apparent that a reduction took place during the 1960-1979 period in state procurements of animal husbandry products from private plots (with the exception of milk) and that an increase took place in the procurements of vegetables and potatoes. These changes occurred owing to the improvements realized in the branch structure of the private sector. For example, during the Seventh Five-Year Plan the proportion of animal husbandry products in the private sector amounted to 69.2 percent, during the Ninth Five-Year Plan -- 66.5 and during the Tenth Five-Year Plan it decreased to 65.8 percent. This trend came about owing to improvements in the culture of farming on the private plots and a substantial increase in the number of manual and office workers engaged in collective horticulture and gardening and also by a reduction in the number of animals being maintained by the population.

Special importance is attached to the kolkhoz market with regard to supplying the population with food goods and developing the private sector. More than 5,000 municipal kolkhoz markets, numbering almost 1.5 million trade points, are in operation throughout the country. In addition, there are a large number of temporarily active markets which have not been registered officially and an intra-village market, where a considerable proportion of the output is sold (in a number of republics, the sales for some products at these markets at times exceed the sales volume at municipal markets). In 1980, 7.4 billion rubles worth of products (in 1975 -- 5.2 billion rubles worth) were sold on the kolkhoz (non-village) market. Its proportion in the sale of food goods to the population, in identical prices for all types of trade, amounts to approximately 5 percent.

The division of labor between the public and private sectors in the sphere of production is supplemented by the division of labor in the sphere of circulation. The kolkhoz market is a component part of the national economic food agroindustrial complex and is a necessary partner in the public sector, since the latter, owing to an insufficiently developed logistical base for the procurement, storage, processing and sale of food products, cannot sell all of its output to the private sector. The variety of products available on the kolkhoz market supplements substantially the product structure of state trade. For example, in 1978 cabbage constituted 41 percent of the vegetable sales in state and cooperative trade and on the kolkhoz market -- only 13 percent.

At the present time, the public sector is incapable of expanding the production of all types of agricultural products, especially the labor-consuming crops which require great expenditures for mechanization, to the scales capable of satisfying the requirements of the population. Thus support is required for all types of

agricultural production. The functioning of the private sector involves achieving solutions not only for problems of a production-organizational, economic and legal nature but also for socio-psychological and cultural-domestic problems which go beyond the limits of this sector.

The normal development of the private sector requires that it receive support from the kolkhozes, sovkhozes and state on the whole. Thus the agrarian policies of the CPSU are aimed at further developing and strengthening the links between public production and the private sector and establishing effective forms for interaction between them. In the process, it should be borne in mind that the private sector will retain for many more years its important role of supplying food goods. The importance of the private sector is mentioned in the USSR Constitution. It was also stressed during the November (1978) Plenum of the CC CPSU. "The potential of the subsidiary farms of plants and factories and also of the private plots of the rural population is still being used to only a weak degree" emphasized L.I. Brezhnev in a speech delivered before the November (1978) Plenum of the CC CPSU, "We have adopted decrees dealing with these matters and yet they are still being carried out only slowly. More assistance must be furnished to these farms in acquiring milk and in supplying feed. A requirement also exists for creating a definite social climate in which the kolkhoz members and sovkhoz workers would feel that they are performing useful state work by raising livestock and poultry at home."

The difference existing between the public and private sectors assumes an expansion and strengthening of mutually advantageous relationships between them. In recent years, new and effective forms have been developed for production-trade cooperation and integration among all types of farms. In the fraternal socialist countries, particularly in the VNR [Hungarian People's Republic], cooperative contacts between the public and private sectors are being expanded on a contractual (multi-year) basis.

Special interest is being displayed in their highest forms, in which the long-term contractual links embrace not only the sphere of production supply for the private farms and the marketing of their products, but are also extended for production purposes, thus defining a change in the technology for and the organization of labor on the private farms. These contacts, by bringing together in the reproduction process the public and private means of production, are promoting an improvement in the level of socialization of production and labor on the private plots.

In the VNR, the peasant farms, based upon contractual arrangements between them and SKhPK's [agricultural producers' cooperative], are being supplied with young stock for fattening, feed, bedding and veterinary services. The cooperative guarantees a market for their products, defines the production technology and the schedules for delivering the products and it promotes high quality and greater production volumes. The SKhPK computes for the members the number of working days completed on the private plots based upon the contracts. They are presented with preferential credit for production purposes. Private plot committees function within the cooperatives for the purpose of coordinating all solutions for problems associated with the activities of the private plots. In many of the Hungarian cooperatives, a private plot is managed as a separate, specialized subunit (branch) of the public sector of

the cooperative. This subunit (which specializes, for example, in swine raising or vegetable production) has its own management and its own agricultural machines, transport vehicles and implements. The branch develops on a planned basis. The initial material for planning includes family plans for developing the private plots, composed by cooperation specialists based upon consultations with expert-specialists, who are members of the private plot subunit, which is headed by the deputy chairman of the cooperative. The family plans are included in the summary plan of the branch and cooperative.

Agricultural enterprises which usually organize the fattening and maintenance of animals on farms of the population, upon instructions handed down by the meat industry, carry out their work in close contact with the public farms which supply pedigree animals and with the enterprises which produce feed. The feed requirements for private livestock are taken into account in the plans for producing and procuring feed on the public farms and the supplying of such feed to farms of the population, based upon contracts, is carried out during the required period, in the required quantities and, as a rule, in a definite assortment. The value of the livestock fattened on farms of the population, based upon contracts with cooperatives, is taken into account in the indicators for fulfillment of the cooperative plan.

Direct reproduction contacts between public and private production have recently begun to develop in the USSR. True, as yet they have not been properly organized and they appear as special organs for directing the development of private plots on the farms. Thus, in Gor'kovskaya, Voronezhskaya and Penzenskaya Oblasts, extensive use is being made of a system of cooperative contacts between public and private farms, mainly in connection with the fattening of swine and the maintenance of sows, in Odesskaya Oblast -- in the fattening of poultry and in Volynskaya and L'vovskaya Oblasts -- in the fattening of long-horned cattle.

Both the private plots and the kolkhozes and sovkhozes are interested in the establishment of contractual arrangements. For example, in 1979, at the Kolkhoz imeni M. Kutuzov in Tatarbunarskiy Rayon in Odesskaya Oblast, the production cost for 1 quintal of weight increase in geese, fattened on the basis of contracts with the population, amounted to 66.3 rubles, young pigs -- 92.4 rubles, whereas for fattening carried out at the kolkhoz the figures were 162.4, 204.1 respectively. In the first instance, the feed expenditures in feed units per quintal of weight increase amounted to 3.5 and 4.0 kilograms and in the second -- 4.3 and 7.2 kilograms. Beyond any doubt, this is not meant to imply that greater economies are to be realized through contracts with the population, as opposed to the public sector, since the feed consumption accounts include only the feed being received from the kolkhoz and fail to take into account the feed provided by the population itself and added to the rations for the animals undergoing fattening or other expenditures of the owners of the private plots. For the kolkhoz, this type of collaboration with private plots is economically justified.

The specialists in L'vovskaya Oblast have estimated that if 50,000-60,000 head of large-horned cattle are fattened on a contractual basis annually, then the oblast will realize a savings of 15-20 million rubles just in the construction of livestock facilities alone and the public sector will attract 1,500 additional individuals into production operations.

The experience of the USSR and other socialist bloc countries in organizing contractual arrangements between the public and private sectors is such that it can be recommended for extensive dissemination. In January 1981, the CC CPSU and the USSR Council of Ministers adopted the resolution entitled "Additional Measures for Increasing the Production of Agricultural Products on the Private Plots of Citizens." In the decree, which calls for a broad range of measures aimed at supporting the private plots, raising the material and moral interest in managing them and strengthening their links with public production, a special place is set aside for the development of contractual arrangements. Thus, it has been recommended that the goskhozes and kolkhozes conclude, on a strictly voluntary basis, agreements with the population residing on their territories and participating in public labor and also with pensioners, for the raising and procurement of livestock and poultry and for procuring surplus milk. In this regard, USSR Gosbank is assigned responsibility for extending short term credit to the agricultural enterprises for the maintenance of timely accounts with the population for the raising of livestock and poultry on a contractual basis. It has been established that the number of livestock fattened on the basis of contracts can exceed the norm for livestock privately owned by families. The livestock, poultry and milk procured by agricultural enterprises on the basis of contracts with citizens are sold by these farms to the state and the transactions are included in the production volume and in fulfillment of the procurement plan, with a bonus being paid for quantitative and qualitative indicators.

The recommendation has been made to have the kolkhozes and sovkhozes to provide additional tracts of land for the raising of forage crops to those citizens and organizations of consumer cooperation with whom they concluded contracts for the production of animal husbandry products. Such land will be made available from their private land funds or from land that temporarily is not being employed by the farms. In addition to such farms, the number of which will obviously increase substantially during the next few years, numerous multi-branch and mainly sooperative private plots will be continued. These farms also require a more improved logistical base and active support on the part of society. A situation should never be tolerated wherein increased attention is given to one type of private plot at the expense of another. "Assistance must be furnished to kolkhoz members and sovkhoz workers in the form of young stock and feed" commented L.I. Brezhnev in his report delivered before the 26th congress, "This also applies to those who maintain livestock on a privately owned basis and to those who fatten livestock which belong to kolkhozes and sovkhozes."

We are of the opinion that the contractual arrangements which are being employed today only for the animal husbandry branches must be developed, on a voluntary basis, for field crop husbandry, particularly in vegetable growing, fruit production and flower growing. An extensive system of material incentives for production on the private plots (presenting of credits for production purposes, authorizing the issuing of young livestock to young families at sovkhozes free of charge at the expense of the farms, possibility of paying off credit extended to sovkhoz workers for acquiring cows and heifers using the funds for economic incentives of an enterprise and so forth) testifies to the great amount of attention the party and government are giving to the development of the private plots and to the fact that this sector is not a sphere for particular private interests, as has been stated in

earlier economic literature, but rather it is a sphere in which private, collective and national interests are combined.

In the future, changes will take place in the branch structure of the private sector, in the volume of its output and in the ratio of consumer and commodity production. In the future, based upon the development of kolkhoz and sovkhoz public production, substantial improvements in the availability of food goods for the population, a considerable increase in the income of rural workers and a number of other conditions, an irreversible overall reduction in production operations on the private plots will commence. Until that time, the private sector will retain its importance.

But even in the extremely remote future the private plots will not completely die off. A portion of the members of society will still wish to benefit from the fruits of their own labor, through the raising of plants and domestic animals. Without drawing any social analogy, it bears mentioning that in developed capitalist countries, with their complicated problems associated with the sale of good goods, a boom is taking place in amateur orchard and gardening activities. In the U.S.A. there are 3 million farmers and 32 million orchard and gardening enthusiasts. According to data obtained from a special questionnaire, it is estimated that there are still 6 million more Americans who would like to maintain an orchard or garden but for the fact that they are unable to obtain land.*

Under socialist conditions, the possibility of the private sector continuing in the future is not excluded, although its character, culture and volumes will change substantially.

The normal development of the private sector can be assisted by the creation in the center and in various areas of a definite coordination organ. Such an organizational structure for the private sector either exists or is being created in other CEMA countries. For example, in the NRB [People's Republic of Bulgaria], within the framework for directing the National Agroindustrial Union, which includes the country's agroindustrial complex, the plans call for the creation of a special board of directors for solving those problems associated with the development of the private sector, for controlling the use of norms in managing it, for organizing logistical supply and for the production and procurement of agricultural products from the population.

The creation of a single coordinating organ capable of solving the many problems connected with the functioning of the private plots is required for solving the interdepartmental problems associated with providing them with production assistance. This will promote the more complete utilization of the production potential of the private sector as a source for food products, a source which supplements the public production of kolkhozes and sovkhozes and intensifies the division of labor

* The development of orchard and gardening activities on tiny tracts of land has brought about a raised demand for dwarf varieties of fruit and vegetable crops and for miniature items of equipment (in the U.S.A., the production of orchard and gardening tractors and motorized cultivators amounted to 919,000 units in 1978, almost 3.6 times more than the number of medium and heavy duty tractors.

between it and public production, in the interest of raising the efficiency of agriculture and accelerating the rates of its growth.

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AGRO-ECONOMICS AND ORGANIZATION

LONG TERM CREDIT FOR AGRICULTURE ADVOCATED

Moscow VOPROSY EKONOMIKI in Russian No 4, Apr 81 pp 97-104

[Article by V.V. Kochkarev, candidate of economic sciences and chief of administration for USSR Gosbank: "Long Term Credits in Agriculture"]

[Text] Taking into account the need for further and stable improvements in agriculture, the "Principal Trends for the Economic and Social Development of the USSR During the 1981-1985 Period and for the Period Up To 1990" call for appropriate capital investments to be allocated for agriculture during the Eleventh Five-Year Plan. In the process, the task has been assigned of "raising in every possible way the effectiveness of capital investments of a productive nature and utilizing them mainly for raising the fertility of the land, creating a stable feed base for animal husbandry and capabilities for the primary processing of output, constructing storehouses and warehouses and for the modernization and expansion of livestock facilities and other installations."

Long term credits play a considerable role in the creation of the logistical base for agriculture and in the use of capital investments by interenterprise organizations, kolkhozes and sovkhozes. The amounts of these credits are increasing annually. For example, in 1970 USSR Gosbank issued 3 billion rubles worth of long term credit to agricultural enterprises and organizations, in 1975 -- 6.9 billion and in 1979 -- 8.3 billion rubles worth. In recent years, the trend has been towards an increase in the number of kolkhozes utilizing long term credit. At the beginning of 1980 the number of kolkhozes using long term credit amounted to more than 90 percent. In 1979 the kolkhozes were issued 4.5 billion rubles worth of long term credit for capital investments, compared to only 1.4 billion rubles worth in 1965. At the present time, the kolkhozes are unable to carry out one more or less large scale operation in the absence of long term credit.

During this modern stage, the requirements of many kolkhozes for long term credit are becoming more acute. This is borne out not only by the sharp increase that has taken place in the absolute amounts of long term credit, but also in the increase in the proportion of credit in production expenditures. In 1965 the proportion of credit in capital investment expenditures was 32.6 percent and by 1979 it had increased to 43 precent. At kolkhozes in some union republics the proportion of credit is even higher. Thus, in 1979 it amounted to 57 percent at kolkhozes in the RSFSR and in the Armenian SSR -- 45 percent. At many kolkhozes, long term credit is the principal source for the formation of capital investments. The highest proportion of credit is found at kolkhozes having a low level of profitability.

An analysis of the structure of long term credit reveals that borrowed funds are employed mainly for capital construction and for acquiring agricultural equipment, that is, for measures which will serve to strengthen the logistical base of agriculture. The use of long term credit for capital construction is most effective. In 1978, for example, credit was used at the Kolkhoz imeni Zhdanov in Novoselitskiy Rayon in Chernovitskaya Oblast for building a commercial dairy farm for 800 cows at an estimated cost of 1.39 million rubles. In 1979, 3,099 tons of milk were produced at this farm and a weight increase of 23 tons of meat achieved. This enabled the farm to realize 129,000 rubles of additional profit during just 1 year of operation.

Despite the fact that the conditions for issuing long term credit to sovkhozes are for the most part the same as those for kolkhozes, the effect of bank credit for the financing of capital construction at state agricultural enterprises (at sovkhozes, poultry factories and so forth) is less significant than it is at kolkhozes. Thus the proportion of long term credit in the sources for capital investments at sovkhozes in 1979 amounted to only 10 percent. The financing of capital investments here is carried out mainly by means of internal resources and budgetary funds. However, the budgetary system for financing capital investments does not call for mandatory reimbursement of the funds obtained or for their more efficient use.

Distinct from other resources, long term credit is a permanent and more stable element in the formation of fixed capital and, a point which is very important, the payment for this credit is low. In addition, the basic principles underlying the issuing of credit, particularly reimbursement, stimulate the farms into making more efficient use of their fixed productive capital and searching for the possibility of more completely uncovering existing reserves.

In view of the fact that the volumes of capital investments in agriculture are constantly increasing, it can be assumed that in the immediate and remote future the role of long term credit investments will also increase. This will be reflected in a further increase in the issuing of long term loans, in raising their proportion in capital investment expenditures, in closer interaction of credit with the internal resources of farms that are intended for these purposes and in an organic link with the movement of fixed capital. An expansion in long term credit for capital expenditures at sovkhozes affects many processes concerned with controlling finances and, in particular, the creation and distribution of profit, coordination of the volumes of the principal production with capital investments, interrelationships with the budget and bank and so forth.

Distinct from budgetary financing, all credit (short term, medium term and long term) is reimbursable and thus great importance is attached to establishing the schedules for paying off credit and to the timeliness of its reimbursement. The majority of agricultural enterprises return their credit in a timely manner. The untimely payments of credit by individual farms is often associated with natural calamities and also with shortcomings in their production-financial activities (non-productive losses, over-expenditure of resources and so forth). The return of credit is influenced by the fact that the schedules for the repayment of loans are not adequately coordinated with reimbursement for the credited measure.

The need for further strengthening cost accounting and for making more efficient use of capital investment funds requires that the system for the repayment of loans be

closely coordinated with the schedules for placing the projects in operation and with their reimbursement. But quite often such a dependency is lacking. Quite often the project has still not been placed in operation or operational capabilities have not been mastered and the period for the repayment of the credit is already at hand. As a result, the enterprise is forced to make repayment for the credit not from savings obtained from the operation of the given project, but rather by means of amortization deductions and savings obtained from the operation of other projects. The establishment of schedules for the repayment of long term loans, taking into account reimbursement for credited measures, confronts the kolkhozes and sovkhozes confronts the kolkhozes and sovkhozes with a number of problems associated with the distribution of profits, it prompts the farms into once again forming working capital and the sources for covering them (in particular, it tasks the kolkhozes with the setting of norms for internal resources).

The successful issuing of credit for the capital expenditures of kolkhozes and sovkhozes is greatly dependent upon the efficiency of the financial mechanism and upon the observance by both parties of the basic principles for organizing credit. The existing system of long term credit for kolkhozes and sovkhozes and also interenterprise organizations still does not exert sufficient active influence upon the fulfillment of the capital investment plans or the efficient use of funds allocated. For example, in the planning and issuing of loans and their repayment, one principle is not being taken into account today -- availability of credit. Further improvements in the system for issuing credit for capital investments must call for more complete and active influence of the basic principles of credit upon the formation of the capital investment plans and the effective use of material and financial resources. In this instance the credit mechanism will promote the more rational use of the fixed capital of kolkhozes, sovkhozes and interenterprise organizations.

Growth in capital investments is determined by the development of public production. In turn, fixed capital created by means of capital investments promotes an increase in the production volume for agricultural products and a reduction in the production costs for these products. A study of the basic principles for organizing credit and further improvements in these principles are opening up broad opportunities for intensifying the effect of the credit mechanism with regard to the use of capital investments and production efficiency.

On the whole, the planning for the overall volume of capital investments for kolkhozes throughout the country, republics, oblasts and rayons is not adequately coordinated with the planning of credit. This derives from the fact that at the present time the plans for capital investments are not being made available to the kolkhozes, as they are to the sovkhozes, and many farms plan inflated volumes of capital investments without taking into account the availability of material and financial resources. Thus, in 1980, at kolkhozes in the Belorussian SSR, the capital investments exceed the volume taken into account in the computations for the state plan for economic and social development by 140 million rubles, in the Estonian SSR -- by 29 million rubles and in the Azerbaijan SSR -- by 31 million Rubles. This often causes a shortage at many kolkhozes in internal sources and long term credit for covering the planned volume of capital investments. In their accounts, the farms are forced into artificially inflating the internatl resources intended for capital investments. This is mainly found in the item "Deduction of

funds from net income for augmenting the indivisible fund in the fixed capital portion," which often leads to disorganization in the fulfillment of the plan for capital investments and to a weakening of contractual discipline in the accounts with contractual organizations and suppliers for material values and also with Gosbank for loans. Some kolkhozes, in the plans for capital investments, introduce changes in the estimates for expenditures -- they call for new construction for a particular project, without correcting the sources for covering the capital expenditures, as a result of which the proportions between the expenditures and sources embodied in the plan are disrupted.

The constant increase taking place in the volumes of capital investments in agriculture and qualitative improvements in the structure for forming the fixed capital of kolkhozes and sovkhozes, conditioned by the development of specialization in agriculture and its integration with industry, are raising the need for more active participation of the agricultural organs in planning the volumes of capital investments and long term credits for kolkhozes. Such planning must be based upon preliminary requests and plans of the kolkhozes themselves, which present them in advance to the rayon agricultural administrations. This is an objective requirement for the successful development and strengthening of the logistical base for agriculture and for the rational use of fixed capital.

Under conditions in which the task is posed of improving planning and the economic mechanism, great importance is attached to achieving a balance in the capital investment plans for those branches participating in the formation of the logistical base for agriculture. During planning, a requirement exists for achieving a balance not only in the capital investments but also in the sources for their formation. This will make it possible to exercise more efficient control over the effectiveness of use of the funds allocated. The task of all organs associated with the formation of the capital investment plans is that of achieving a proper balance for them in terms of the logistical, labor and financial resources.

A sound determination of the requirements of the farms for long term credits plays a special role in the formation of the sources for covering the capital investments. Bank credit must be directed towards measures which ensure fulfillment of the plan and which furnish the greatest return for each ruble invested. All credit policies in the sphere of capital investments must be subordinated to this principle. The coordinated planning of long term credit by the agricultural organs and the institutes of USSR Gosbank will make it possible to combine the efforts of these organs towards solving the problems concerned with raising the effectiveness of use by the farms of internal and borrowed resources. Coordination of the actions of the agricultural and bank organs will create a firm foundation for close coordination of the production volumes with the capital investments and the sources for covering them.

In the planning of long term credit, consideration must be given to the fact that during some years agricultural production is subjected to the effects of unfavorable weather conditions. In this regard, the kolkhozes and sovkhozes are being under-supplied in terms of income intended for capital investments. The kolkhozes and sovkhozes have been forced into addressing requests to the appropriate organs asking that they be allocated additional long term credit. Thus, the plan for long term

credit should make provision for the reserve required for achieving stability in carrying out the volumes of capital investments approved in the national economic plans.

The internal resources of kolkhozes, sovkhozes and interenterprise organizations that are intended for expanded reproduction, especially deductions from profits, play a great role in the timely implementation of their capital investments. In 1970, the kolkhozes deducted 54 percent of their profits for capital investments; in subsequent years, the amounts of these deductions decreased (in 1979 -- 48 percent). Not all of the farms are deducting funds in a timely manner from income intended for capital investments. Many farms, generally speaking, are not allocating money for these purposes. Thus, at the beginning of 1980 the indebtedness of kolkhozes in fund payments for capital investments amounted to 972 million rubles. Some kolkhozes having a relatively high level of production profitability are deducting resources for the indivisible funds in negligible amounts. In this manner they are limiting their potential for expanded reproduction. For example, the kolkhozes in the Kazakh SSR decreased their deductions of funds from net income from 50 percent in 1975 to 40 percent in 1979 and in the Moldavian SSR -- the figures were from 59 to 44 percent.

Many kolkhozes which are realizing considerable sums of profit are assigning it in large amounts to various funds and they are using long term credit to compensate for a shortage in funds for implementing capital investments. For example, in 1980, 428 kolkhozes in the RSFSR having surplus internal working capital planned to deduct still another 14.2 million rubles for the purpose of augmenting this capital. At the same time, these kolkhozes are planning to obtain long term credit for capital investments in the amount of 115 million rubles. To some extent, the shortcomings in the distribution of profits into the savings and consumption funds result from the fact that up until now no economically sound normatives have been available for the distribution of net income at kolkhozes having different levels of economic development and equipment availability.

An intensification in the relationship between long term credit and the internal resources of kolkhozes, sovkhozes and interenterprise organizations cannot be reduced to merely defining the proportions for the given sources of capital investments. During some years the relationship between the internal resources of farms and long term credit may vary. The bulk of the net income obtained, the proportion of deductions into the fixed capital, the availability of fixed capital, the amortization deductions for the fixed capital and so forth may all exert an effect on the amounts of internal resources intended for capital investments. However, expanded reproduction requires that the farms constantly increase their deductions of funds from profits for capital investments.

Quite often, the projects being erected in the rayons, oblasts and republics are not fully supported in terms of material, labor and financial resources and the construction volumes are not coordinated with the potential of the contractual construction organizations. Individual projects, owing to a shortage of resources, are not being placed in operation in a timely manner and, as a result, the volume of unfinished construction is increasing. The construction delays are to a large degree predetermined during the formation stage for the plans for capital investments, since many farms, with the knowledge of the agricultural administrations

and when composing the production-financial plans, strive to include more new construction projects in them and they allocate appropriations for these projects, while not viewing them as either carry-over or underway projects. Thus, the funds are distributed among many projects. In the case of such planning, a contractor cannot concentrate his forces on an optimum number of projects and an increase takes place in unfinished construction. For example, its volume at the beginning of 1980, for kolkhozes alone, amounted to 84 percent of the annual construction expenditures.

One of the reasons for non-fulfillment of the plans for placing fixed capital in operation and for growth in the volumes of unfinished construction lies in the fact that the contractual organizations, for example inter-kolkhoz construction organizations created mainly by means of kolkhoz funds and responsible for carrying out construction work mainly for them, tolerate prolonged delays in the placing of projects in operation, while over-fulfilling at the same time operations being carried out for the state and other enterprises. In 1979, the plan for contractual work for kolkhozes and interenterprise organizations was underfulfilled by 253 million rubles, while the plan for state organizations was over-fulfilled by 115 million rubles.

Experience has shown that during the course of determining the volumes of capital expenditures, thorough consideration is not always given to the real opportunities for supplying construction materials and equipment or to the capabilities of the contractual organizations. To some extent, this derives from the fact that the individual indicators for the production-financial plans of farms are not adequately coordinated with the potential for logistical support. Difficulties subsequently arise in connection with the supply of logistical resources for the work volumes planned and with the capabilities of the contractual organizations and this is reflected in the fulfillment of the capital investment plans. In this regard, we are of the opinion that the principal indicators for kolkhoz plans should be reflected in the material and financial balances.

The constantly increasing volume of capital investments in agriculture requires an appropriate increase in the capabilities of the construction organizations and improvements in control over them. Some shortcomings in capital construction are caused by the fact that up until now a single method has not been developed for determining the production capability of the construction-installation organizations. Another cause derives from the fact that state projects and also those of inter-kolkhoz construction organizations are often built at the same populated points. The different departmental subordination of these organizations leads to a lack of coordination in their operations and this adversely affects capital construction in agriculture. The need for further improving it requires the establishment of a single management over the state-kolkhoz organizations, with centralized use of the resources. At the present time, in the Georgian SSR, where the inter-kolkhoz organizations are subordinated to the republic's Ministry of Agriculture, experience has been accumulated in single management over the state and inter-kolkhoz construction organizations, where the use of labor, material and financial resources has become more effective.

In connection with improving the activities of the construction organizations, special importance will be attached to converting them over to the new working conditions -- accounts for a project that is ready for operation. In the process,

an evaluation of the activities of construction organizations will be carried out based upon the production of marketable products. The use of a single indicator in construction requires that the tasks for both the customer and the contractor be uniform. Ideally, in addition to being developed and approved for the contractual organization, the plan is also reflected in the capital investment plan of the customers, that is, the kolkhozes, sovkhozes and interenterprise organizations. In connection with the conversion of the construction organizations over to the new working conditions, we are of the opinion that the oblast and republic organizations should be transferred over to cost accounting. This will make it possible to raise the level of management for the construction organizations and, in this manner, carry out more successfully the plans for commodity production and lower its cost.

Under existing conditions, with unfinished production exceeding to a considerable degree the normative indicators and with the new construction of projects often being carried out in the absence of proper consideration being given to existing potential, the national economic plan for republics, oblasts and rayons, in the section on capital investments in agriculture, should ideally stipulate the volume of capital construction in a monetary expression and also the number of large-scale projects being built simultaneously, especially complexes for the fattening of large-horned cattle, poultry and so forth and the amounts of unfinished construction. In the interest of ensuring a normal course for the construction cycle and more efficient use of resources and mechanisms, a proper ratio must be achieved during the planning for newly begun construction projects and objects and for the required inventories. On the other hand, the regulation of capital construction requires that the projects erected be provided with logistical and financial resources and the capabilities of the contractual organizations. The logistical resources should be allocated in conformity with the requirements established based upon the plans and estimates. In addition, a solution must be obtained for the problem concerned with creating a reserve of logistical resources in construction.

Analysis reveals that the fixed capital of kolkhozes and sovkhozes has increased considerably as further growth has taken place in capital investments and as more long term credit has been extended to agriculture. On many farms, the capital-output ratio is increasing. This is mainly caused by the fact that model recommendations have not been developed for equipment availability on the farms, taking into account their specialization, zones and so forth. The need for raising the effectiveness of capital investments and fixed capital requires the development of such recommendations.

In recent years, an increase has taken place in agriculture in the retirement of fixed capital. For example, in the Azerbaijan SSR the value of the fixed capital retired at kolkhozes alone in 1979 amounted to 6.2 percent of their value at the beginning of the year. Quite often the fixed capital is written off prematurely. As a result, the farms are forced into replacing them using resources which were intended for expanded reproduction and this lowers the rates of growth for agricultural output. Experience has shown that a considerable reduction takes place in the proportion of the active part of the fixed capital, as a result of absolute and relative growth in the working capital. Moreover, this trend has assumed a stable character at a majority of the kolkhozes and sovkhozes throughout the country. In order to raise the effectiveness of use of fixed capital, use should ideally be

made, when planning the structure for capital investments and the sources for covering them, of indicators for the proportion of capital investments used in the formation of fixed productive and non-productive capital, with special attention being given to the formation of the active part of the capital.

In recent years the kolkhozes, sovkhozes and interenterprise organizations have been making more active use of long term credit for the construction of production installations -- complexes for the fattening of livestock and poultry. For these installations, which produce great economic results, the institutes of Gosbank are providing credit for a period of from 10 to 20 years. However, the effectiveness of use of the funds allocated for capital investments is dependent not only upon the construction of new production complexes, but also upon how well the farms utilize their existing fixed capital and upon the timely expansion and modernization of existing buildings and facilities. In this regard, capital investments for new construction must be allocated only in those instances where all opportunities for modernizing production have been exhausted and production growth cannot be achieved through existing capabilities. Ideally, the capital investments for the modernization of farms and other production facilities and the indicators for such modernization should be approved in the five-year plans.

In the interest of raising the effectiveness of capital investments and accelerating the course of construction, great importance is attached to timely and high quality support for agricultural construction projects in the form of planning-estimates documentation. However, planning-estimates documentation is not being made available in a timely manner for many planned construction projects. For example, according to the situation on 1 May 1980, the kolkhozes had not formalized the financing in Gosbank for the capital construction of 20,600 projects representing an annual volume of668 million rubles worth of work. They were not accepted for financing because the planning-estimates documentation was not ready, delays were encountered in drawing up agreements with contractors and because of a number of other reasons. At the same time, planning-estimates documentation often remains for long periods of time within the institutes, where it becomes obsolete and never enters into use, thus the expenditures involved in composing such estimates are wasted.

In the interest of raising the responsibility of the planning institutes and customers for the high quality presentation of planning-estimates documentation, during the period in which the draft plans for contractual work are composed, a more improved system should be developed for issuing material incentives to the workers at planning institutes for creating more economic plans. The absence of an efficient mechanism for issuing economic incentives led to a situation wherein, in 1979, the planning-estimates documentation for the construction of kolkhoz projects was inflated by 42 million rubles; following an inspection, the kolkhozes agreed to reduce the estimated cost by 36 million rubles. During this same year, their cost was lowered by 1.6 million rubles by the institutes of Gosbank as a result of construction-installation work carried out by the kolkhozes. Controlled measurements carried out at kolkhoz construction projects established an inflated amount of 25.4 million rubles.

Many kolkhozes and sovkhozes are diverting resources for goals not associated with the development of agricultural production and tolerating disruptions in planning and financial discipline. This adversely affects the results of their work and hinders

fulfillment of the plans for capital investments. Various organizations in the different areas are utilizing facilities belonging to kolkhozes and sovkhozes and they are not paying any rent or making reimbursement for the cost of their expenditures. For example, the Kolkhoz imeni Chapayev and the Kominoern Kolkhoz in Shadrinskiy Rayon in Kurganskaya Oblast built two stores for consumer cooperation at a cost of 92,000 rubles, the expenses for which were repaid on the day of inspection but only in the amount of 20,000 rubles. The Sharikhanskiy Rayon medsanob"yedineniye has occupied for a period of 20 years a building belonging to the Kolkhoz imeni A. Akhunbabayev in Moskovskiy Rayon in Andizhanskaya Oblast, at an estimated cost of 57,700 rubles, without paying rent. Individual institutes of the organs of public health and culture in the Georgian SSR have been using buildings free of charge, that are maintained on the balances of kolkhozes, the cost of which is approximately 1 million rubles.

Quite often the kolkhozes and sovkhozes transfer tractors, motor vehicles and other logistical resources to outside organizations free of charge. During the January - September 1979 period alone, such resources valued at approcimately 4 million rubles were so transferred, including by kolkhozes in Kulyabskaya Oblast in the Tadzhik SSR -- more than .7 million rubles. Similar incidents have taken place in the Latvian, Moldavian, Ukrainian and Kirghiz union republics. Quite often the higher organizations obligate the farms to allocate material and monetary resources for the construction and welfare of cities and rayon centers and for the repair and maintenance of automobile roads of both local and republic importance, over and above the norms established by existing legislation.

In order to eliminate the mentioned shortcomings, an efficient system must be established for controlling the expenditures of material and monetary resources by the kolkhozes and sovkhozes and for observing the established system for the utilization of resources intended for agricultural development. The proper use of capital investments requires that all elements in the economic mechanism: planning, finances, credit, price, profit -- exert an active influence with regard to reducing the construction schedules and the placing of projects in operation; this being one of the most important reserves for raising the effectiveness of public production. Agricultural construction carried out on the basis of complete cost accounting exerts an active influence on the effective use of capital investments. During this modern stage in the development of agriculture, when in direct unity with the tasks for raising the efficiency of public production problems associated with the rational use of capital investments are being solved, the requirement for economic and credit influence by Gosbank over all aspects of economic-financial activity is not only not decreasing but in fact it is becoming more urgent.

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TILLING AND CROPPING TECHNOLOGY

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CHEMICAL APPLICATIONS IN AGRICULTURE DURING ELEVENTH FIVE-YEAR PLAN

Moscow DOKLADY VASKHNIL in Russian No 5, May 81 pp 1-4

[Article by V.G. Mineyev, corresponding member of VASKhNIL: "Chemical Applications in Agriculture During Eleventh Five-Year Plan"]

[Text] The development of the domestic agrochemical science is closely associated with solving the problems of chemical applications in farming in our country. At the present time, the use of scientific achievements and leading experience in agricultural production is acquiring special urgency. There are many interesting and important scientific works which, for various reasons, are still not being introduced extensively into the practice of chemical applications.

For all practical purposes, the combining of science with production and the effect upon it of progressive ideas take place through improvements in the technology and the machines. This then is the essence of scientific-technical progress.

As early as 1915, V.I. Lenin wrote that the intensification of farming is "neither a random, nor local, nor episodical action, but rather it is a common phenomenon of all civilized countries" [V.I. Lenin, Vomplete Works, Vol. 27, p 168). It signifies "a conversion over to high field crop husbandry systems, increased use of artificial fertilizers, improved implements and machines and increased use of these implements and machines..." (ibid, p 181). These Leninist positions resounded with special force during the October (1980) Plenum of the CC CPSU and also in the Principal Trends for the Economic and Social Development of the USSR During the 1981-1985 Period and for the Period Up To 1990, approved during the 26th CPSU Congress. The following statements are contained in these trends:

"To implement measures in a consistent manner aimed at increasing the deliveries and making more rational use of chemical materials in farming and animal husbandry. In 1985, to ensure that agriculture is supplied with mineral fertilizers in the amount of no less than 115 million tons in conventional units, chemical feed additives in the amount of 5 million tons and highly effective agents for protecting plants -- 650,000-680,000 tons. To improve the supply to agriculture of chemical agents used for preserving feeds.

"To increase the role played by the agrochemical service in agriculture and its responsibility for the efficient use of mineral fertilizers, lime materials and chemical plant protection agents. To introduce on a more extensive scale the methods

employed for local applications of fertilizers. To achieve a sharp reduction in mineral fertilizer losses during storage, transporting and utilization.

"To achieve more complete and efficient use of organic fertilizer resources. To equip the farms with the highly productive machines and implements required for achieving these goals. By 1985, to increase the volume of organic fertilizer use to 1-1.2 billion tons. To improve the quality of work carried out in connection with the liming of acid soils."

In this regard, it bears mentioning that agrochemistry as a science is confronted by a number of important tasks. First of all, an overall approach is required for solving the problems of chemical applications, while taking into account the potential and level of development of allied branches of the national economy. Today it is not enough to merely define the future requirements of farming in mineral fertilizer volumes and assortment, but rather importance is attached to possessing knowledge of the agrochemical raw material resources, the potential of the chemical industry, its production capabilities and the availability of specialized transport for hauling the mineral fertilizers. Finally, a solution must be obtained for the problem of creating a modern logistical base for the use of mineral fertilizers (equipment for making preparations for applying mineral fertilizers, warehouses for their storage and so forth).

An inter-branch scientific work -- the creation of a chart on the country's future mineral fertilizer requirements and a geological-economic evaluation of the agrochemical raw material resources -- can serve as an example in this regard.

These materials were developed jointly by scientists and specialist-agricultural chemists, geologists, chemists and economists. They set forth the consumption of mineral fertilizers and the future requirements for them of agriculture, from the standpoint of each oblast and kray; the status of the country's agrochemical raw material resources in the country's depths -- tested and predicted reserves; the status and prospects for extracting, enriching and processing the agrochemical raw materials.

These studies are making it possible to solve a common complex national economic problem -- the food program -- while taking into account the need for supplying the growing population of our country with food products that are scientifically sound in terms of both quantity and assortment.

During the past few years, the agrochemical science has created a number of important works considered to be of interest for the practice of chemical applications in farming. For example, the annual mineralization of humus often reaches 1-2 percent of 1-1.5 tons per hectare. A most important indicator for growth in soil fertility is a positive or self-supporting balance of humus and nutrients.

The maintenance of such a self-supporting content of organic substance in sod podzolic and grey forest soils is possible with an annual application of 10-15 tons of organic fertilizer per hectare. On leached and podzolized chernozem soils, one half this amount can be applied in combination with mineral fertilizers.

According to data obtained from many domestic and foreign studies, the "humus effect," that is, the additional increase in yield obtained from organic fertilizers,

compared to an equivalent amount of mineral fertilizer nutrients, is 5-10 percent. It increases in particular under extreme conditions, for example, during arid years.

An important indicator of soil fertility is its content of mobile forms of phosphorus. Studies have established the following: in keeping with the modern level of yields and for a majority of the sod-podzolic soils, the optimum level of mobile phosphates in the soil is 10-15 milligrams per 100 grams of soil; for intensive crop rotation plans, for example, with potatoes -- 20-25; for podzolized, deep and common chernozem soils -- 10-15 milligrams per 100 grams; for calcareous chernozem soils, chestnut and chernozem soils -- 3.0-3.5 milligrams per 100 grams.

For grain crops, the optimum content of mobile potassium in a sod-podzolic type soil is 20-25 milligrams per 100 grams.

For raising the phosphorus content 1 milligram per 100 grams of soil, according to Kirsanov, and over and above that withdrawn in a crop, 40-60 kilograms of P_2O_5 should be applied per hectare to sod-podzolic sandy soils, 60-90 kilograms to light textured and medium loamy soils and 90-120 kilograms per hectare to heavy clay-loam soils. The average for sod-podzolic soils is approximately 80 kilograms per hectare.

On chernozem soil, in order to raise the content of mobile phosphorus 1 milligram per 100 grams of soil, over and above the amount withdrawn, 50-70 kilograms of P_2O_5 are applied per hectare. On calcareous chernozem soil and chestnut soils, in order to raise the content of mobile phosphorus 1 milligram, 90-150 kilograms of P_2O_5 must be applied per hectare over and above the amount withdrawn.

The potassium content in soils is increased by applying 30-50 kilograms of K_2O per hectare over and above that withdrawn by a crop.

On the basis of this data, it is possible to compute, knowing the initial content of mobile elements, the amount of fertilizer required for achieving the optimum content in the soil.

The proportion of a yield realized from fertilizers applied was also established. In the sod-podzolic zone it amounts to 50-55 percent, in the forest-steppe zone -- 28-30 and in the steppe zone -- 18-20 percent.

The proportion of an increase in a grain crop yield obtained from individual nutrients, in the sod-podzolic zone and for N is 50-60 percent, P_2O_5 -- 30-32 and K_2O -- 13-15 percent; in the forest-steppe zone -- 48-55, 25-40 and 18-20 percent respectively; in the steppe zone -- 35-40, 40-50 and 12-15 percent.

According to data obtained from extended fixed experiments, a positive balance for all elements on sod-podzolic soil, in a crop rotation plan of average intensity (12-20 percent row crops), is achieved with the following annual applications (in kilograms): 90-150 N, 70-90 P_2O_5 and 90-150 K_2O. In this instance, the productivity of 1 hectare of crop rotation area is 40-45 quintals of grain units per hectare. A positive balance is observed in the forest-steppe zone with the following applications (in kilograms): 100-120 N, 70-80 P_2O_5, 120-130 K_2O. The productivity of the crop rotation plan reaches 50 quintals of grain units per hectare.

A system of fertilizers should be developed and employed taking into account not only the weather and climatic conditions and the soil fertility, but also a single technology with agrotechnical and land reclamation measures, specialization in a crop rotation plan and in the biological characteristics of the type and variety of crop. A disruption is such an overall approach in the use of fertilizers brings about a considerable reduction in their effectiveness. This is observed quite often in actual practice, especially in the cultivation of sugar beets, potatoes and other crops.

Today the scientific workers and farm specialists are confronted with the task of raising considerably the effectiveness of the fertilizers in use, the shortage of which will continue for some time to come directly out on the kolkhoz and sovkhoz fields.

A differentiated approach must be employed in the development and introduction of technologies associated with the use of fertilizers, with consideration being given to the degree to which the autonomous republics, krays and oblasts are supplied with these fertilizers. For example, the Volga region, the Urals, Siberia and a number of other zones of Russia are being supplied with very little fertilizer. Here they talk about developing and employing optimum fertilizer systems, that is, they are out of touch with the actual status of affairs in actual practice. The problems concerned with fertilizer systems require detailed study, with the prospects for chemical applications being taken into account. In actual practice, use must be made of the most effective methods developed by science for applying minimal amounts of mineral fertilizers.

In those zones, especially where there is irrigation and on drained lands, where adequate quantities of fertilizer are available, use should be made at the present time of effective fertilizer systems in specialized crop rotation plans.

Where there is a shortage of mineral fertilizers, importance is attached to properly distributing them in behalf of the more important crops, in order to obtain a maximum return. For example, of the grain crops, winter wheat responds best to mineral fertilizers. In view of the fact that it is actually a semi-irrigated crop, the return from mineral fertilizers in its cultivation is higher than that for spring grain crops. It should also be borne in mind that winter wheat is grown rather often following occupied fallow and non-fallow predecessor crops, which strongly impoverish the soil in terms of nutrients. Thus raising the fertilizer norms for winter wheat is an important reserve for increasing the gross yields of grain.

Computations reveal that if the winter crops are supplied with the average amount of $N_{50}P_{45}K_{40}$ fertilizer recommended for obtaining the planned yield during the current five-year plan, then approximately 1.5 million tons of nutrients will be required for an area in excess of 10 million hectares in such regions as the nonchernozem zone of the RSFSR, TsChO [Central Black Earth Region], the Volga region and the north Caucasus. The gross yield of winter wheat grain will amount to no less than 27 million tons. The experience of leading farms reveals that during the past few years the effectiveness of fertilizers for winter wheat has been close to the normative data. This once again confirms the practicality of scientific computations.

In raising the grain yields, great importance is attached to increasing the productivity of spring wheat, the principal areas of which are located in the steppe zones of the eastern regions of the country, where the effectiveness of fertilizers is determined to a considerable degree by moisture conditions. The best moisture conditions are created here when wheat is grown following clean fallow. Under such conditions, the effectiveness of phosphorus fertilizers increases. Hence, special purpose mineral fertilizer funds should be set aside for these zones and the fertilizer should be applied in behalf of spring wheat following fallow.

In Ural'skiy Rayon and in western and eastern Siberia, spring wheat is being sown on an area in excess of 3 million hectares following clean fallow. If 33-35 kilograms of P_2O_5 are applied to each hectare, the yield will amount to no less than 22-23 quintals per hectare and the gross yield of grain -- no less than 7 million tons. This is scientifically sound data.

An important task of the agrochemical science consists also of developing and testing new forms of mineral fertilizers under various soil-climatic conditions: slow acting, capsulated and highly concentrated forms (in combination with plant growth stimulants and nitrification inhibitors). In the process, importance is attached to taking into account the high coefficient of use of nutrients in such fertilizers, their effect on a crop and the quality of the output and to preventing their being lost into the environment.

In connection with the deficit in mineral fertilizers, maximum use should be made of local fertilizer and land reclamation resources (all types of organic fertilizers, phosphorites, limestones and dolomites, defecate -- waste products of sugar beet production and so forth). For example, each ton of air-dried defecate contains 600-700 kilograms of lime, 100-150 kilograms of organic substance, approximately 5 kilograms of N and P_2O_5, 6 kilograms of K_2O and so forth. It produces a fine agronomic effect on grey forest lands, podzolized and leached chernozem soils and on other soils having a hydrolytic acidity of 2 milligran-equivalents per 100 grams of soil or more.

The problem of using the waste products of various branches of industry for fertilization purposes is becoming more acute. A maximum amount of caution must be displayed and high agrochemical requirements maintained in carrying out this work. Such waste products should necessarily undergo bulk analysis so as to ensure that heavy metal or toxic chemical compounds are not added to the soil.

A program of agrochemical studies may call for the solving of current problems with long-range tasks for chemical applications in farming, that is, from theoretical works intended for the more remote future, up to the present time. In this regard, studies concerned with realizing the potential productivity of plants, taking into account the soil and natural-climatic conditions, are acquiring special scientific and practical interest. This is a very important problem of modern agrochemistry.

Unfortunately, it is impossible not to notice the obvious failure to properly evaluate the theoretical studies in agrochemistry, without which it is impossible to solve the many problems of chemical applications in farming, not only in the remote but also the immediate future.

Importance is also attached to raising the effectiveness of science. This is first of all dependent upon improving the research methods and equipping the laboratories with modern analytic and highly productive equipment for the mass analysis of soils, plants and fertilizers. In the process, priority importance is attached to the availability and proper placement of highly skilled scientific personnel.

At the present time, an orderly system has been created in our country for successfully carrying out theoretical and applied agrochemical studies, for testing scientific developments within the agrochemical service system and for introducing them into the operational practice of kolkhozes and sovkhozes. The task is one of solving these complicated but nonetheless very important problems in a complete and business-like manner.

The carrying out of the decisions handed down during the 26th CPSU Congress with regard to strengthening the logistical base for chemical applications in agriculture, raising the effectiveness of agrochemical studies and further improving the forms for agrochemical services will make it possible to solve successfully the tasks for further raising the productivity of farming, which in turn will ensure to a great degree fulfillment of the food program.

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